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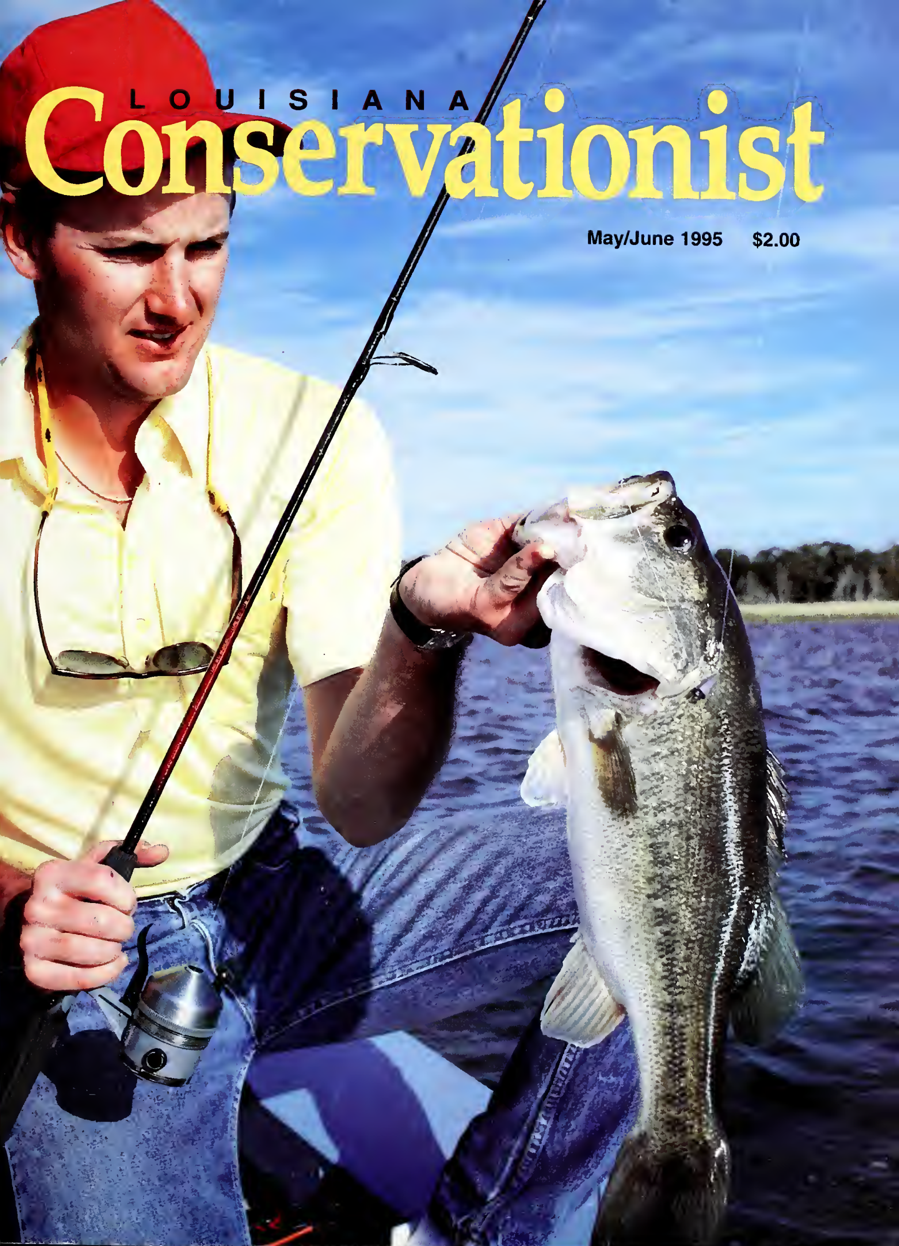

Joe L. Herring, Secretary

Louisiana is blessed with as great an abundance of natural, renewable resources as any state in the nation. In spite of that abundance, or perhaps because of that abundance, we find ourselves constantly divided and embroiled in often bitter controversies over allocation of those resources. The current controversy centers on allocation of redfish and speckled trout and the associated issue of gill nets used by commercial fishermen.

These are truly needless arguments. This Department has demonstrated repeatedly that our renewable fish and wildlife resources can provide ample, sustainable opportunity for all our citizens through sound management. As we all know, that management must include a clear understanding of the species, including its life cycle, population dynamics and habitat requirements. Then we must establish reasonable harvest restrictions to ensure that the total number of fish or animals harvested does not exceed the total number of fish or animals entering the population each year. Finally, we must have firm, effective enforcement of regulations enacted to protect the habitat and limit the total harvest.

Our ability to successfully manage any renewable fish and wildlife species has been proven, not only with deer, turkeys, alligators and pelicans, but also with redfish and speckled trout.

In my opinion, the allocation controversy over these popular species is specious, at best. Gill nets were not responsible for the collapse of the redfish stocks in the Gulf of Mexico in the 1970s. A lack of proper management was the root problem. There was an absence of effective regulations in state and federal waters which severely reduced redfish spawning stocks in federally controlled offshore waters. Severe freezes exacerbated the problem by killing many juvenile redfish in inshore waters. With the prohibition of purse seining offshore, suspension of commercial harvest in inshore waters and severe restrictions on recreational harvest, redfish stocks have rebounded rapidly. Proper management practices will prevent excessive harvesting in offshore waters and allow a reasonable harvest of redfish by both recreational and commercial fishermen.

My case is clearly supported by the current status of our speckled trout stocks. Gill nets are the primary harvest tool for commercial fishermen targeting speckled trout. Trout, too, were seriously set back by severe freeze losses. In that case, we instituted sound management practices immediately. An annual quota was established for commercial fishermen and creel limits were curtailed for recreational fishermen. The result has been a rapid recovery of our speckled trout stocks and a continuous, shared allocation between commercial gill netters and hook-and-line recreational interests.

That our renewable fish and wildlife resources can be successfully managed to provide abundant, sustainable harvests is beyond argument. There is no justification for bickering over allocation of that harvest between commercial and recreational interests.

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Front Cover Bass Fishing
Photo by C. Boyd Pfeiffer

Back Cover Sunset on Lake Martin.
Photo by Leo Quebedeaux

Next Issue The *Louisiana Conservationist 1995-96 Calendar*

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Louisiana's Political Oyster

LDWF file photo

Are Gulf of Mexico oysters really a significant health risk when eaten raw or is the media uproar an attempt by northern coastal states to boost sales of their oysters? Fact and rational truth is the only way to settle the controversy.

BY MARIANNE MARSH

In 1994 the FDA office in Washington, D.C., sent a proposal to the Interstate Shellfish Sanitation Conference (ISSC) recommending a ban on Gulf of Mexico oysters during the warmer months of the year. Once again, radio and television news programs and newspapers throughout the country began warning the public that oysters from the Gulf of Mexico were deadly.

What are the facts behind this media blitz? Are oysters on the half-shell dangerous to eat or is this a marketing plug for the East and West coast oyster industries?

The ISSC is the governing body for setting regulations for harvesting, processing and selling oysters. The proposal from the FDA was referred to a study committee and will be addressed at the 1995 conference in July. In the meantime, the facts about raw oysters and the related dangers must be cleared up.

The recent increased media attention to risks associated with eating raw shellfish, and Gulf of Mexico oysters in particular, stems from several cases where individuals died after consuming raw oysters. But the facts behind these cases show that all the deceased individuals had underlying illnesses that made them highly susceptible to the bacterium known as *Vibrio vulnificus*.

Vibrio vulnificus is one of approximately 66 species of vibrio bacteria found naturally in marine aquatic environments. It is found in eastern and western coastal marine environments as well as Gulf Coast waters. It is not a result of pollution, as much of the media hoopla has implied.

About 11 of the 66 species of vibrio in marine environments can cause illnesses in humans under certain circumstances. The two most pathogenic are *Vibrio cholerae* and *Vibrio parahaemolyticus*. The other nine, including *Vibrio vulnificus*, cause isolated and sporadic incidents in only select individuals. The occurrence is not of epidemic proportions but the risk is dramatically greater in individuals who have predisposed underlying diseases.

The toxicity of *V. vulnificus*, the resulting primary septicemia (blood poisoning) and its high mortality rate are linked directly to those individuals who suffer from compromised health issues. These issues include cancer or leukemia undergoing chemotherapy, diabetes, kidney or liver disease, steroid dependency (used for conditions such as emphysema), stomach or upper intestinal problems treated with antacids on a long-term basis AIDS and hemochromatosis/hemosiderosis (abnormal iron metabolism). Although people with these disorders cannot safely eat any raw shellfish, they can eat shellfish that is boiled, fried or cooked in any other way.

The Center for Disease Control (CDC) in Atlanta has released numerous reports on the bacterium *Vibrio vulnificus*. It was first identified by CDC in 1976 and three years later given its current name. It is not a new bacterium or a new wave of contamination, but a new wave of negative publicity for the Gulf Coast oyster.

The problem does not lie with consumption of oysters, but with the education of those who cannot safely eat any raw shellfish. Education is essential for combating both life-threatening illnesses and the negative publicity haunting the Gulf Coast oyster industry. The strategy is public education with an objective to inform raw oyster consumers. Even though some may not be aware that they are in a high risk group, everyone should be aware of the dangers.

The bacteria is a part of nature and cannot be eliminated. Education puts the responsibility where it belongs — on the individual — without threatening a valuable Louisiana industry or the lives of healthy consumers.

Prior to CDC making the identification, the general public simply did not know the dangers of raw shellfish bacteria. Since 1979 there has been extensive research, numerous case studies and a wealth of public warnings from health agencies. Restaurants, seafood markets, oyster bars and other places where seafood is sold have made a diligent effort to post warnings on the dangers of eating raw seafood.

It is the choice of the individual whether or not to expose himself to certain health risks. Dr. David Cook of the Food and Drug Administration laboratory at Dauphin Island has done extensive research on *V. vulnificus*. His posture on the issue is that shellfish are safe to eat when cooked, for all people. They are also safe to eat when raw for healthy individuals. Again, he points out the responsibility of the consumer for his own health.

"It's like smoking. Everyone knows smoking causes cancer. But many continue to smoke," explained Cook. " Those individuals who have compromised health issues must make up their own minds whether to take the risk of eating raw shellfish."

One vibrio case that drew extensive coverage occurred in 1992. A Georgia resident died while on vacation in Florida after eating two dozen raw oysters. After investigating the case, it was found that the individual had hepatitis C and was being evaluated for a liver transplant. This is clearly a case of an individual whose health was seriously compromised and who should have avoided raw seafood of any form. It was an unfortunate tragedy, but studies of cases resulting in death from consuming raw oysters have shown that 100 percent of the individuals

Consuming oysters on the half shell is a favorite past-time for many people. The key to eating raw oysters is to have good health.

LDWF file photo

Photo courtesy of the La. Seafood Promotion & Marketing Board

Oyster processors are inspected routinely by several regulatory agencies, such as this inspector from the Food and Drug Administration. But despite strict regulations on the oyster industry, Gulf Coast oysters continue to have a bad reputation.

affected had underlying diseases.

There are three illnesses caused by *V. vulnificus*: wound infections, gastroenteritis and primary septicemia (blood poisoning). Wound infections and gastroenteritis should be treated by a physician to prevent developing into septicemia. Primary septicemia is a life-threatening illness that develops suddenly and must be treated immediately.

Wound infections from *V. vulnificus* can be serious and sometimes occur in normal as well as high risk individuals. This is a result of direct contact with the bacteria to the wound site from exposure to seawater or punctures from marine-related activities. However, according to CDC, 80 percent of the reported patients are high risks. Wound infections account for about one-third of the total cases of *V. vulnificus*, but only 8 percent of the fatalities.

Gastroenteritis is a minor GI tract infection caused by ingestion. No deaths have been contributed to this unpleasant illness. But again, the large percentage of those affected are high risk individuals. There are very few cases reported in persons with no known underlying illnesses, but other enteric pathogens are frequently isolated with *V. vulnificus*. CDC reports that these are probably from other food sources.

Primary septicemia is extremely serious. It is caused by ingestion or untreated wound infection and carries a mortality rate of 50 percent in high risk individuals. Primary septicemia occurs when the bacterium invades the bloodstream. When the immune system has been compromised, it cannot battle *V. vulnificus*. In a report from a *Vibrio vulnificus* workshop held in Washington, D.C., in June 1994, CDC stated that 100 percent of primary septicemia patients had underlying illnesses. Only high risk individuals are susceptible to the potentially lethal primary septicemia. A normally healthy individual has never been reported to contract this illness.

Illnesses from *V. vulnificus* and other shellfish bacteria are not unique to Louisiana and the Gulf Coast. Cases involving illnesses related to shellfish bacteria have been reported from all coastal waters where oysters, clams and mussels are harvested. But with *V. vulnificus*, its potential danger is highlighted by the Gulf's warmer temperatures. *V. vulnificus* is a bacterium that multiplies more rapidly in warm waters, therefore focusing attention on Gulf oysters. During the warmer months of the year, there are more cases of *V. vulnificus* infections than during cooler months. However, this does not mean it is present only in Gulf oysters. It is also present in other oyster species along the Pacific and Atlantic coasts, but stays dormant longer due to colder water temperatures.

Along the West Coast there have been cases of *V. parahaemolyticus*. This species does not cause the same illnesses as *V. vulnificus* but is nonetheless considered a dangerous pathogenic species. Along the East Coast of Canada a toxin called domoic acid has been recorded in numerous cases of individuals who consumed raw mussels. It is not really an acid, but a marine biotoxin, causing chemical intoxication. It produces a syndrome called Amnesic Shellfish Poisoning, damaging the central nervous system and resulting in brain damage.

The focus of alleged "killer" Gulf oysters is directed mainly to Louisiana because Louisiana's shellfish industry produces one-third of the nation's oysters. And the motives behind the publicity are not all humanitarian. The Louisiana Department of Wildlife and Fisheries (LDWF) plays a large role in this industry, along with public health agencies, by policing oyster beds and processors as a means of protecting the consumer and the industry. LDWF's Oyster Program Manager, Ron Dugas, deals with the harvesting and processing of oysters on a daily basis. Even though this matter has health significance, the badgering of Gulf oysters, he believes, is partly political.

"The West Coast oyster industry is very politically correct," commented Dugas. "The Gulf of Mexico has always been labeled as a sewage dump and cases of vibrio from Gulf oysters give people an excuse to slander our industry. The truth of the matter is that vibrio is not a result of pollution nor is the Gulf any more polluted than the East or West coasts." Dugas also added that the market demand for Gulf oysters is consistently greater than for East or West coast oysters because of taste. If our Gulf oysters are labeled bad, then the demand increases for the other, inferior oysters of the East and West coasts.

Gulf oysters have received more negative attention regarding *V. vulnificus* because promoters of oysters produced in colder waters boast of not having this bacterium present. It is a true statement only to some degree. *V. vulnificus* in dormant is colder temperatures, but research shows that the bacterium is still present. Oysters taken from cold waters with no detectable signs of *V. vulnificus* were placed in 30-degree C. seawater tanks. After three or four days, *V. vulnificus* was recorded in the same numbers normally found in warmer waters.

No matter what is said of Gulf oysters, Louisiana's industry is strictly governed by federal health standards. All oyster processing in Louisiana is done according to guidelines established by the National Shellfish Sanitation Program. These guidelines are used by all oyster producing and processing states. Sanitarians conduct unannounced visits to each oyster processing facility at least once every two months. But despite these careful procedures, Louisiana's oysters are constantly badgered by the public and media as dangerous and deadly.

Dr. Louise McFarland, State Epidemiologist with the Department of Health and Hospitals (DHH), has been studying *V. vulnificus* since the early 1970s. Her role in the identification and study of the bacterium has been instrumental in correcting the misunderstandings and myths. According to McFarland and reports from DHH, the death risk associated with consumption of raw Louisiana oysters is one in 25 million raw oysters eaten. There have been deaths in Louisiana connected to the consumption of raw oysters, but every case was linked to underlying illnesses in the deceased individual.

Between 1977 and 1994 there have been 35 cases of *V. vulnificus* reported in Louisiana which resulted in death. Of these cases 29 were primary septicemia, linked to the consumption of raw oysters, in which the individual had underlying illnesses. The other six were from wound infections and again, all the individuals were suffering from compromised health issues.

The obvious conclusion is that people suffering from compromised health issues such as those previously listed should not eat raw seafood of any kind. Doing so is analogous to someone with a liver or kidney disorder eating raw beef, chicken or pork. Numerous safeguards are in place to protect the general public, but in the final analysis it is primarily the responsibility of the individual to take control of his or her own health.

Once the myths and fears of eating oysters (raw or cooked) are dispelled, it is important to know that the oyster is a highly nutritional food. It's an excellent alternative to meat, with only 68 calories, 2.5 grams of fat and 55 milligrams of cholesterol in a 3½ounce portion. Most dietary programs today include two servings of shellfish a week. Cooked oysters are as safe to eat as any food item. Raw oysters are also safe to eat for healthy individuals who choose to do so.

Are raw oysters deadly? Each person must answer that question for himself. If there is any doubt, consult a doctor about any health issues in question. It is a decision each individual must make, not the industry, health officials nor the media. ■

Cooked oysters can be enjoyed by everyone. They're high in nutritional value and can be prepared in a variety of ways. This recipe is Butter Basted Oysters and can be found in this issue's "Bayou Kitchen" on page 35.

Photo courtesy of the La. Seafood Promotion & Marketing Board

Tilapia

Louisiana's Least Known Resource

STORY & PHOTOGRAPHY BY ANDY CRAWFORD

Tilapia have been reared in captivity for centuries. Steve Abernathy is now bringing the industry for this delicacy to Louisiana, providing yet another market for Louisiana aquaculturalists.

Tilapia has long been a staple in Africa and the Middle East, prized for the delicious flavor of its flesh and ease of rearing in aquaculture endeavors.

The large perch-like fish is so easy to grow that it is one of the most ancient artificially cultured fish in the world, dating to biblical times. It is said by some sources that the fish Jesus Christ multiplied for the masses was tilapia.

Over the years, tilapia has become popular fare throughout the world. Chefs like it because its firm, white flesh holds together well and the mild taste mixes delightfully with various sauces. Restaurant patrons like it because it just plain tastes good.

Louisianians are late-comers to the tilapia craze. While restaurants in other states have been using this fish for years, our state's traditional rich marine life has led seafood lovers here to demand and expect such species as redfish and speckled trout.

Since about 1989, however, supplies of these local favorites have dwindled — redfish because of a ban on commercial harvesting and specs because of reduced stocks.

New Orleans chefs, who had become known for their wildly popular blackened redfish, began searching frantically for a replacement. Seafood wholesalers in the area quickly latched onto tilapia. The rest is fast becoming history.

"It was an interesting fish," said Preston Battistella, owner of Battistella's Seafood in New Orleans. "It had a good reputation and had enjoyed popularity in Europe." That company now sells between 600 and 800 pounds of tilapia fillets each week.

The problem of availability remained an obstacle for many restaurants. This fish, which becomes marketable at about 1¼ pounds, was in such demand elsewhere that New Orleans chefs could not find dependable supplies.

Three years ago, Brennan's Restaurant manager Kathy Abernathy finally had had enough. She asked her husband, Steve, to find a dependable supply of the fish.

Steve first looked for tilapia aquaculture farms close to New Orleans but the closest were in Mississippi and Arkansas. He first visited the Arkansas farm, which was selling about 2 million pounds of tilapia each year.

"They couldn't sell me a fish," he said. He got the same story at the Mississippi business.

So Steve traveled around the country — Florida, Alabama, North Carolina, Iowa — to locate the sought-after delicacy.

"The end result was they couldn't sell me one fish," he said. "Every fish they raised was already sold."

The disappointments, however, showed the former millworks owner that tilapia offered an economic opportunity to someone willing to invest time, effort and money.

He contacted the LSU Cooperative Extension Service and began putting together plans to farm the fish in Louisiana, despite that fact that it was illegal at that time to possess live tilapia in this state.

"I wanted to supply fish to a handful of restaurants in New Orleans," Steve said. "I thought I couldn't lose."

As it turns out, he was right. By 1991, rules administered and enforced by the Louisiana Department of Wildlife and Fisheries (LDWF) were put into effect, allowing the aquaculture of tilapia in this state.

The nine pages of regulations are some of the most rigid in the country. Any aquaculture facility raising tilapia must be completely indoors and use a recirculating water system to ensure that no tilapia escape. Escapement is a real concern because the fish are extremely prolific, with adults reaching sexual maturity in a matter of months and spawning every two or three weeks thereafter.

"These fish would reproduce so fast that by sheer numbers they could replace native fish," LDWF Inland Fisheries biologist Mark McElroy said.

This is not just rhetoric. Tilapia are extremely hardy, dying grudgingly and only after enduring conditions that would doom almost any other species. "They are a freshwater, saltwater, brackish water fish," Steve said.

They also can survive extremely low oxygen levels. "These fish are survivors, period. You can throw this fish on the ground and come back three hours later and it will swim away. It's just incredible," he added.

Florida and Texas serve as examples of what happens when this exotic species escapes into the wild. Both of these states now have strong tilapia populations established in many of their waterways.

Steve Abernathy, who was the first to apply for permission to grow tilapia in Louisiana, said the regulations are necessary despite the difficulties of compliance.

"Louisiana, I think, is doing it right," he said. "The regulations, as they are written now, prevent backyard operations."

By the time he received a permit to begin operations, Steve had purchased facilities in Robert, La., and his business plan was ready to go.

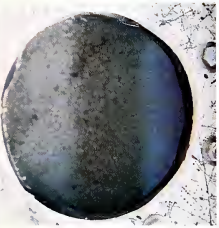
"I had it all together. I found this place and I had my research done," he said.

He has never looked back and Tiltech, as he named his company, remains one of only two permitted tilapia farms in the state.

Within a few months, Steve had built four huge, 4-foot-deep pools inside a large greenhouse in which he would eventually hold between 15,000 and 20,000 pounds of tilapia.

A first-of-its-kind filtration system was installed to recycle water in the

Tilapia are mouth breeders, meaning females release their eggs, then scoop them up and hold them in their mouths until hatched. Eggs are expectorated when their hosts are captured, allowing aquaculturalists to collect the eggs using very fine-mesh netting.



Tiltech Inc. uses a filtration system, top, designed by LSU engineers to be more compact and efficient than conventional aquaculture filters. These first-of-their-kind filters contain thousands of small beads, bottom, on which ammonia-eating bacteria grow and which clean water passing through the system.

pools. The filters were designed by LSU civil engineer Dr. Ron Malone and were unique because the system was small and produced almost no waste water. The system is so efficient that more than 400 have been sold nationwide since its introduction in 1991.

The filters are large, enclosed tanks containing thousands of small beads. Ammonia-eating bacteria grow on these beads, effectively cleaning water passing through the filter.

Conventional filtration systems are bulky, space-consuming monstrosities that require as much as 30 percent of the available facility. The new LSU-designed filters are much smaller.

"They take up less than 5 percent of our space," Steve said. "That means more room in which to grow tilapia.

The new filters also require maintenance and cleaning only every 48 hours. "I can clean these filters by myself in about 30 minutes," he said.

Conventional filters, on the other hand, require hours of hard work daily to clean. One company's filters, Steve said, require seven hours work from a three-man team. This extensive cleaning process usually means that the system's water is replaced on a regular basis, increasing the chances that tilapia will escape.

The Malone-designed filters lose almost no water during cleaning, resulting only in about 40 gallons of sludge with each cleaning. "It takes 2½ years to replace the water in this system," Steve said.

"LSU is absolutely revolutionizing aquaculture. They have made it so you can grow anything, anywhere, anytime."

Steve's original objective was strictly to supply market-sized tilapia for New Orleans-area restaurants. That plan didn't pan out. For the first two years, he sold to independent processors outside of the state because there are no permitted processors of tilapia in Louisiana.

The nature and needs of his competition, however, has further altered his goal. Steve now is supplying a stable source of tilapia fingerlings for other tilapia aquaculture operations.

Most farms outside Louisiana consist of outdoor ponds. Tilapia cannot survive in water much colder than 60 degrees, so outdoor farms in cooler regions such as Arkansas, North Carolina and Iowa are necessarily seasonal operations. They must purchase fingerlings each year.

"Every spring, they're starting over," he explained.

That proved too tempting an opportunity to pass up. "The demand for fingerlings is amazing," Steve said. "We'll produce probably 5 million fry this year and they're all sold already."

The fact that Tiltech is one of only three year 'round producers of tilapia fingerlings increased the attractiveness of the venture. The state regulations requiring tilapia farms to be completely indoors makes 12-month fingerling production easy.

"The thing about an indoors facility is you can have total control over everything," Steve said. That control allows water in his system to be kept warm enough even in the dead of winter to spawn fish.

The combination of high market demands, a suitable environment and strong state regulations means that Louisiana has the potential to be a real leader in this industry. The state's climate is roughly the same as the northern fringes of the fish's native environment and the stringent regulations provide economic opportunity while protecting native species from this aggressive exotic.

The demand for gourmet-quality fish already has outgrown the available supply, so aquaculture really is the place to be in the food business. Restaurants in New York City alone, Steve said, import between 60,000 and 100,000 pounds of tilapia each week.

"I think the market is growing by leaps and bounds and far exceeds what present supply can satisfy," Steve said.

Preston Battistella points to pending net-banning legislation in Louisiana and existing legislation in other Gulf Coast states as proof of this.

"With less local fish available, fishermen will have to get what they can for the fish they are catching. Prices will be higher," he said. "It looks like aquacultured fish are going to become more and more attractive."

This is music to the ears of one former millworker who saw and filled a niche.

"There's just too much of a market to blow it," Steve Abernathy said. ■

Basics of Fishing & Hunting Photography

STORY & PHOTOGRAPHY BY C. BOYD PFEIFFER

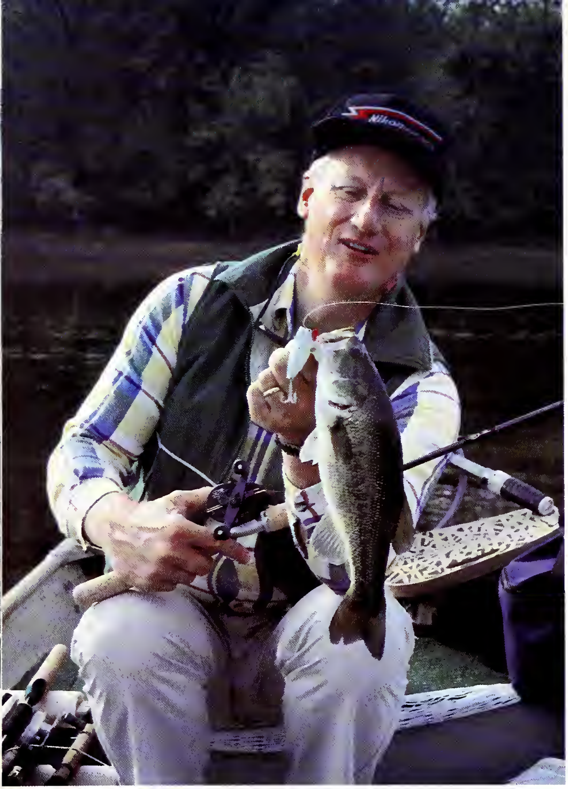
Photos of fishing and hunting trips are visual memories. Through photo albums, slide and wall prints they help us remember and relive those great, funny, tough, challenging, wonderful days afield while fishing, hunting, boating, camping, hiking and otherwise enjoying the outdoors.

Unfortunately, the idea of photos often occurs at the last minute, with such shots taken hurriedly and with little forethought.

The basics of learning about photography through courses, studying reference books and critically examining photos in magazines to see how they were taken were discussed in the last issue. These basics also apply to hunting and fishing photography. The main difference is that nature photography involves the natural world without people; outdoor sports photography involves people enjoying that world.

As with nature photography, almost any kind of camera can be used. Point-and-shoot models are more suitable for people photography than for most nature photography, since most of the shots will be within the zoom range (about 35 to 70 mm) of many of these models.

Other possibilities in the point-and-shoot line to consider are the weather resistant or waterproof models available. Many are weatherproof, meaning that they can withstand a short time in a light drizzle. Few are truly waterproof and, other than deep-water scuba cameras such as the Nikonos, are good only to depths of about 15 to 20 feet. Since the primary concern will be protecting your camera from boat spray, dunking in a fly fishing vest or bad weather in a duck blind, these are fine. They include the now-discontinued (in this country) Nikon Action



Side lighting is often better and softer than front lighting.

Touch, Minolta Weathermatic, the Pentax 90WR and the new Canon A-1. Others are said to be coming shortly.

Any of these small point-and-shoot cameras are ideal. Many have zoom lenses that allow you to compose for the best possible shot. The wide angle adjustment is best for boat shots, while the short telephoto setting (often 70 mm or 105 mm) is better for shots of jumping fish, tight shots of a trophy head or some shots of game.

If using a standard 35mm SLR camera with interchangeable lenses, a wide angle such as 24 or 28mm will be best for small boat photography. For other shots, consider a standard 50 mm or 35-70 zoom with close focusing ability, and a zoom telephoto such as a 70-210 or 80-200 for long shots.

Since photos are permanent memories, it is best to begin your outdoor shots long before the fish are caught or the game killed. Friends getting ready, reloading shells or tying flies for the trip, packing and checking maps are all important memories. Even travel on the road is a good subject. Once at your fishing camp or hunting lodge, keep your camera ready to record preparing meals, trying game calls, sharpening hooks and readying tackle, chopping wood, building blinds and similar camp activities. Once fishing or hunting begins, record your partners casting, glassing a far area for game, rigging baits, working hunting dogs, etc. Nothing is too trivial or unimportant to make a good shot.

Good shots of any subject are those that fill the frame (don't waste the negative area), with the horizon straight (particularly with water shots) and with no unnecessary elements in the picture. Too many photos are afterthoughts, taken just before fish are gutted or released and game cleaned and quartered and taken at home or in unnatural surroundings. The result is pictures in which there is half a car, part of a chain link fence, a dog and part of two telephone poles instead of a trophy shot with the fish and game when and where it was taken.

When bird shooting, it is easy to take shots from a low angle as the dog brings birds back to the owner or as the dogs work a field. Low shots are particularly important when working with dogs, since any shot is best taken from the eye level of the participants and a low shot is far superior to one in which the camera is angled down at the dog.

Duck hunting shots are easy as decoys are placed in the early morning light or as hunters shoot (or pretend to shoot) from a blind. All bird shots are best with the feathers smoothed, blood wiped away, the wings spread out to display the beauty of the bird or a nostalgic shot of the birds, gun, calls and other gear neatly arranged.

When big game hunting, the best shots are those of the trophy. For this, wipe the animal clean of blood and position the hunter with his gun or bow behind the animal. The head of the animal should be raised to show the rack or size of the animal. Try to get the tongue back in the mouth if it protrudes. If the eyes have glazed over, use a little petroleum jelly or even spit to brighten them just before taking the shot.

For fishing photography, the type of trophy shot will depend upon the size of the fish caught. Big fish such as marlin, dolphin, sharks and sailfish can sometimes be photographed as they jump close to the boat, as they are gaffed or wired and as they are tagged or landed.

Smaller fish such as bass, panfish and crappie are best photographed while landing, with water flying as the angler lifts the fish from the water. It is best to have the angler looking at you or looking at the fish — try shots both ways. Make sure that you compose the shot properly. Large fish held horizontally should be shot with the camera held horizontally; fish held up by the jaw (as is often the case with bass) are shot vertically, filling the frame with the subject and the fish.

Fill flash, often built into point-and-shoot cameras, does wonders for making shots even better. Fill flash provides additional light from the camera position to light shadows under ball caps, to fill in other shadow areas and to generally make a brighter, more colorful photo than would otherwise be possible.

Modern cameras without built in automatic flash also usually have this capability when using camera and flash of the same brand. Computer chips in both flash and camera allow the two pieces of equipment to "talk" with each other and create perfectly exposed shots.

In fact, many professional outdoor photographers now place a flash on their cameras anytime they are outdoors and taking pictures within the flash range, usually from about two to 20 feet. The flash can't hurt those shots where it is not needed and can only help those contrasty or shadowy shots.

This does not mean all shots should be taken with flash or fill flash. For example, you might prefer to emphasize the dark, rainy, miserable conditions on some hunts or fishing trips. You may want a silhouette of an angler holding his trophy fish or a hunter with a quail, duck or goose. For this, it is best to have a clear sky or water background, preferably in the early morning or late evening and against the sun or brightest part of the sky.

If the exposure meter you have in the camera can be switched to a manual setting, and if you have a three f-stop difference between the subject and the background, you can take a fine silhouette. Expose for the background and shoot to include the angler or hunter. The result will be a dark or black silhouette of your friend against a normally exposed sky or water.

Shots of gear, tackle or equipment are also good, either with or without the trophy. The close-ups will lend drama to the shots in your album or slide show and variety to the shots of friends with game of fish. Variety is the secret to all good photo displays. Close-up and scenics, people, distant shots of places, fish and game, vertical and horizontal shots, silhouettes and fill flash all benefit from variety.

Scenics are also good in a variety of lighting situations. Don't forget fog, rain, drizzle, mist and similar shots of boats, duck blinds, off-road vehicles, etc. Even in the sun, lighting can make a big difference in the look of photos. Often we are told to take photos with the sun behind us, so that there is full sun (front lighting) on the subject. But the best shots outdoor are often taken with the sun from the side or in back of the subject so as to provide "rim lighting" around a subject to isolate it from the background or to show up line cast in the air, breath of a hunter on a cold day or the fur on the flanks of a bird dog.

If there is a secret to taking outdoor shots, it is in seeing — and grabbing — those shots of views, places, people and situations. After all, photography is in the mind and the eye, not in the equipment. Your equipment, learning to use it properly, the choices of films, shutter speeds, f-stops and other controls, are all important but it is the "seeing" that makes the difference between an average picture and one worth enlarging, placing prominently in a photo album or emphasizing in a slide show. ■

Editor's Note: C. Boyd Pfeiffer is a known outdoor photographer from Maryland whose work appears in many national publications.

Staying behind a hunter allows photographers to get good shots if the bird is against a plain background or sky.

Fish That Fly

Whether they actually fly or simply glide, they can cover astonishing distances over the cobalt sea. How do they do it?

BY DAVID S. LEE©1994
ILLUSTRATIONS BY DUANE RAVER©1994

I looked up to see a flying fish sailing past at eye level, 15 feet out of the water. I turned to the captain to ask if he had ever had any land in his boat? While he was telling me that in 26 years of fishing in the Gulf Stream he never had, an 11-inch-long flying fish crash-landed on the deck below. I rushed down, secured my prize and hurried back to the bridge to ask Captain Baum if his boat had ever been struck by lightning. What I thought was the best one liner of the day was not appreciated. Harry Baum proceeded to recount the times his boat had been struck, how insurance companies refused to insure electrical navigational equipment, and how when....

For years, how flying fish flew was the focus of much debate. Did they flap their enlarged pectoral fins as birds and insects flap their wings? Careful observation and high speed photographic images finally showed that flying fish swim forward and upward through the water at great speed. If their initial spurt fails to get them airborne, the enlarged lower lobe of the tail, the only part of the fish still submerged, vibrates rapidly from side to side, up to 50 beats per second, until the fish achieves a taxi speed great enough for lift-off. This sculling motion is only slightly modified from how fish normally move through the water. On outstretched wings — excuse me, fins — these fish soar above the sea until they lose momentum and drop back into the water. Sometimes they fold their fins and, with a splash, plunge beneath the waves. Other times, their tail action again takes over as they touch down and off they soar once more.

The accepted conclusion was that flying fish don't actually fly — they glide. While I don't wish to make a big thing of this, there is latitude for interpretation here. Dictionaries are not particularly informative: "flight: act or mode of flying;" "flying: act of one that flies;" "fly: to move in or pass through the air." This subject demands common sense, not circular definitions.

Everyone would agree that hawks, bats, moths and airplanes fly and that canned hams, cement blocks and box turtles do not. In between are a small number of things that seem, to different degrees, to fend for themselves against gravity — like red maple and dandelion seeds, parachutes and Tarzan. Also, there are objects designed to minimize wind resistance that can be projected for considerable distances when hurtled into the air — Frisbees, cruise missiles and footballs, for example — but when left on their own each pretty much stay put. The next sequence of thought brings us to "flying" squirrels and lemurs, and "flying" frogs, geckos and snakes. It is generally accepted that these animals, using various skin flaps, appendage modifications and streamlined body designs, simply glide. After launching from a high perch they succumb to gravity and descend in a downward swoop to a preselected landing site. They are parachutes with self-control and never achieve the kind of lift that would free them from the pull of gravity.

Flying fish, unlike paper airplanes or creatures that jump from high places, become airborne of their own power, by propelling themselves upward and forward in a relatively straight flight path parallel to the surface of the sea. They are not thrust into the air by an outside energy source, nor are they simply getting from point A to point B by jumping and gliding from a higher position to a lower one. They appear to exhibit considerable control over both their course and direction. Thus, the real topic is whether or not bird-like wing-flapping is an essential part of the definition of flight. The Wright brothers didn't think it was, and nobody accuses albatrosses, which soar for days on set wings, of not being capable of flight. Like conventional aircraft using a self-contained fuel source, or albatrosses that must run headlong into the wind for takeoff, flying fish are quite capable of propelling themselves and flying for impressive distances before their forward momentum no longer provides enough lift to sustain flight. Frustrated marine predators who try to snatch them from the air believe they can fly, and so do I.

Flying fish are most commonly seen in the Gulf Stream during the warmer months. So at times when there is not much happening on board and when other creatures of the open sea are scarce, I watch fish fly. It's sort of a mindless pastime but always interesting. The movement of the boat, or perhaps the sound of the engine, seems to make them take flight. Usually they take to the air when we are 20 or 30 yards away. Sometimes whole schools of 50 or more launch themselves simultaneously, but normally there is simply one here or two there.

In the course of an hour it is not unusual to see several hundred. Sometimes I try to estimate flight distance or duration; I'm the sole scorekeeper in the Outer Continental Shelf Fish Olympics. Watching flying fish, I am reminded of the lines from Kipling's poem "Road to Mandalay: "Where the flyin'-fishes play, An' the dawn came up like thunder...," wishing I could recall more of the verses and wondering about the real order of the ones I do remember.

After my earliest visits to the Gulf Stream, I combed libraries for information on flying fish. Information was scattered, but an interesting dossier was pieced together. Of the 25 species known from United States waters, 17 occur in the Atlantic, including two species shared with the Pacific. The best I could figure was that there are at least 12 species of flying fish that I could see in the Gulf Stream off North Carolina. Eight species have been confirmed in the Gulf of Mexico, with the blackwing flying fish (*Hirundichthys rondeleti*) being most common. I could recognize five, perhaps six, different types, but really I had no way of knowing what species I was seeing. This predicament was somewhat alleviated by the fact that flying fish come in two basic models, two-winged and four-winged. The four-winged ones have both large pectoral and pelvic fins and look a lot like little biplanes.

Flying fish, unlike paper airplanes, become airborne under their own power by propelling themselves upward and forward in a relatively straight flight path parallel to the surface of the sea.

Steve Ross, a friend who specializes in marine fishes, identified the specimen that crashed onto the deck of Captain Baum's lightning-wise charter boat as *Hirundichthys affinis*, one of the four-winged flying fish. Was this the species I was regularly seeing or were there several types of large silvery, blunt-nosed, four-winged fishes about? The solution was to get more specimens. I had read that people in the Caribbean capture flying fish at night by placing a lantern next to a sail. The fish fly into the light, hitting the sail and flopping into the boat. I considered variations on this theme and then went out and purchased several boxes of no. 9 shotgun shells for my 12 gauge. It took one box of shells to see that I constantly shot well behind the fish, missing them by several yards. Sometimes I wasn't even that close. It took a number of shells from the second box before I learned how far to lead them. Altogether I hit six or eight fish using two boxes of shells. We retrieved four, the others sank. All of these were the same large, silver-colored, four-winged flying fish.

I have seen other types that are quite distinctive in coloration, but to date, I have been unable to collect or identify them. I limited my note taking to *Hirundichthys*. I estimated the longest flights to be between 100 and 125 yards and lasting for 10 to 12 seconds. (One Pacific species has been reported to fly a quarter of a mile.) Usually the fish flew less than a yard or so above the surface, but in strong winds they were sometimes lifted 6 to 10 feet into the air. Based on the forward trolling speed of the charter boats I estimated flight speeds to be about 35 mph, partly explaining my difficulty in collecting specimens with a shotgun. In flight the fish angle upward, so the tail always touches the water last and first on takeoff and landing. With their sculling tail movement they sometimes made two or three composite flights in succession or at times ricocheted from the top of a wave and continued their flight. Each succeeding flight was usually shorter in time and distance than the one preceding it.

Unlike the two-winged species, four-winged flying fishes exhibit a controlled flight even in a strong wind. While the two-winged varieties waft about erratically, *Hirundichthys* flew straight or even banked and changed direction. On calm days the ripples of their lopsided, lobed tail fins remained in the water after takeoff.

The specimens I collected were from 10 to 12 inches long and weighed 97 to 258 grams. Pectoral fin lengths were from 5 to 6 inches, making total wingspan somewhat greater than the length of the fish. By tracing out the wings on a piece of paper and calculating this area I ascertained the wing-loading ratio (surface area of both pectoral and pelvic fins divided by the weight of the fish) was about the same as for Cessnas.

These flying fish were spawning off the Carolina coast in August. Dissecting specimens showed that about half of the females had recently laid eggs and the others soon would. While not a shocking piece of biological information, observations, over time, add up to biological facts. I was impressed with the large swim bladders of these specimens. The same device that provides buoyancy for surface-scooting oceanic fish allowed the ones I collected to float long enough for me to scoop them from the sea.

I have not seen flying fish of any kind in the winter months. Their seasonality suggests that they are migratory and are not simply being passively transported by the Gulf Stream.

Because of their small size, flying fish have an ocean of predators, but the ones I saw most eager to capture flying fish were dolphins. Rushing under them, cutting the water's surface, the dolphins tried to single out individual fish as they zipped off in different directions. While the flying fish can move through air at speeds of 35 mph, dolphins have been clocked at 37 mph. The slight difference in speed is only important in the initial charge; fast swimming speeds build up heat in dolphins' muscles, preventing extended chases. The flying fish, on the other hand, coast once they are airborne, covering long distances quickly with little energy. I never witnessed a capture.

Tropicbirds and Masked Boobys collected off the Carolina coast almost always have remains of flying fish in their stomachs, suggesting that they are a major food item for those predatory birds. These tropical pelagic birds often fly above boats far at sea and I wonder if this is learned behavior resulting from the boat's constant flushing of flying fish.

The large four-winged flying fish are well designed for flight. In both types, the pectoral fins spread after the fish has been lifted out of the water by rapid swimming. To open them beforehand would cause too much drag. Drag is further reduced because only the lower lobe of the tail fin is in the water just prior to takeoff, and power can be effectively added as needed until enough lift is achieved. Just before takeoff, the pelvic fins, which remain tightly folded against the body while the fish is on the runway, are suddenly and broadly spread and the fish gracefully rises into the air. These fins are constantly, and often independently, repositioned to keep the fish on course and the flight stable. The large wings remain fixed. This combination of decreasing resistance in the air and a strong sculling motion in the water is quite effective. Once the lower tail lobe leaves the water it immediately stops its oscillation. At this point the tail and tail fin are only used in turning, like a rudder on a plane. The drag of this aid is reduced because of its wet, mucous-covered skin.

Lift is obtained by the pair of (anteriorly placed) wings at the rear. The upper surface of each wing is smooth and flush and the necessary mechanical strength is in the supporting fin rays that are found below, causing the lower surface of the fin to be ribbed. This arrangement reduces air turbulence on the upper wing and is important to lift. In the four-winged species, additional lift is provided by the pelvic fins and the body is square, the lower surface helping to increase lift, a design much like the fuselage of large cargo planes. The square-bodied, four-winged species have maximized lift and stability; the two-winged ones have speed. Stability is gained, with some sacrifice to flight, by the angle of both the pectoral and pelvic fins. Thus, all the wings tip forward several degrees, for longitudinal stability, and, in a dihedral angle not unlike a soaring turkey vulture, for lateral stability. The flight sacrifice is due to this tipping, which decreases effective wing area. The dihedral angle reduces total length. Horizontal stability is controlled by distribution of weight. It can be roughly measured when the fish is viewed from the side. Like airplanes, about 51 to 53 percent of the fish is below a central axis running down the center of the body or fuselage. This slight shift in distribution of weight keeps it flying right-side up.

Additionally, the fish is weighted and balanced much like a weather vane that always pivots to face the wind. The flight, therefore, is self-correcting, heading the fish into the wind and assuring maximum lift. Actual tracking of flight shows it to be a compromise between the original course in takeoff and the direction and speed of the wind. Thus, the fish's nose points more or less into the wind while its flight path veers to the right or to the left.

With flying fish qualifying for frequent flyer programs, it at first seems curious why they, unlike birds, don't come in a greater variety of sizes. Most are between 6 and 12 inches and the largest, *Cypselurus californicus*, a southern California coastal species, is only 18 inches long. The answer lies in problems associated with initial lift-off, not the function of flight itself. The fish are straddling the life of two worlds and fins that are highly functional in one element are cumbersome in the other. Hindered by this problem, the fish have difficulties in the transition and resistance of the water. Sea planes encounter similar problems in escaping the pull of water and getting airborne.

And there is one other adjustment. The flying fish's lateral line is not down its side as in most fish, but near the belly. I assume this is the logical place for a sensory device that only works under water when its owner insists on doing belly flops all over the ocean. It's one in a long list of adjustments necessary for successful fish flight. Understanding these adjustments is important but I regret the information learned has been used as "evidence" for the school of thought that these fish don't fly. Even if technical reasons beyond logic force them to be regarded as mere self-propelled gliders, they are still fun to watch.

Then, too, there are always the flying squid... ■

The large four-winged flying fish are well designed for flight, with pectoral and pelvic fins broadly spread after the fish leave the water. The pelvic fins also are constantly repositioned to keep the fish on course and stabilize flight.

SPORTING CLAYS: Takin' Over The Shooting Sports

BY CHARLES FRANK

OK, so you've hunted ducks, geese and quail all your life, shot skeet and trap and think you're a pretty hot number with a shotgun. You may even have traveled a bit and tried Chukar and grouse. Well think again. Sporting clays are here and it is a most humbling experience. If ever there was a sport that mixed pleasure with humility — this is it.

Sporting clays are not a new sport — just relatively new to the United States. In the England of post WWI, sportsmen began the informal clay shooting sport as an aid to fitting shotguns for the better gun makers of the time. A good handcrafted English shotgun could be purchased for under $200 and in 1945 a Winchester double barreled Model 21 was wholesaled at under $200. The sport gained popularity with sportsmen who wanted to improve their shotgun shooting but who may not have access to bird shooting. How little things have changed. Today many would-be nimrods have neither the time nor the money to belong to increasingly expensive leases and clubhouses.

Sporting clays offer an affordable substitute. The sport got started in the United States in the mid 1980s and has increased in popularity with each passing year. With some 17.5 million American hunters, is it any wonder that the sport has caught on?

A few months ago, or maybe last year, I was introduced to the field. Having shot my share of 100 straights on the skeet field and tried my hand at international targets from the dropped gun position, I wasn't exactly a virgin. What the heck, shooting is shooting and a few unusual angles would just add spice to the "Potpourri." Well, 50 targets later I was hooked.

What gets you are the variety of configurations in each layout. The background, as in field shooting, can be thick understory or bright sunlight flashing over a lily covered pond. Flushing quail, buzzing teal and whistling woodies are replicated with a delayed release from a concealed trap. By golly, you should hear the cussin' when a running rabbit bounces along the ground and another target flies out, rising to imitate a flushed quail. That one-labeled, "Fin and Feather," takes a bit of getting used to.

A round consists of 50 targets and you'll probably want to try a second round of high flying targets from a tower concealed behind tall trees. This gives you a quick pass at what could be ducks flying over cypress and pin oaks at Stuttgart, Ark. You only have what seems like a micro second to line up and fire. And some of the targets can be mini or Battues.

Another option offered are the "Flurries." Here you are stationed with a team mate on a tower placed over a multiple launcher. The launcher is cycling in an oval so that on release the angle of elevation and the angle of launch are variable. To further complicate your life, the trap handles half-sized targets called "Minies," regular skeet targets, and a flat clay plate $4^{1}/_{4}$ inches in diameter, called a "Battue." The "Battue" does an acrobatic roll and pitch that would turn the Red Baron green with envy. And, in this event, the trap boy releases on report as rapidly as you and your partner can reload and fire. No place for the shooter with a sore thumb.

It is the thrill of variety and the imagination of the field operator that is attracting an ever-growing number of enthusiasts. In 1995, there were 1,500 listed sporting clays locations, most with adjacent trap and skeet fields. The NRA, in its December 1994 issue of the *American Rifleman*, reported that shotgun target shooters increased by 19 percent! More than 700 million clay targets were sold in the past year and 355,000 sporting clays shooters (80,000 more than last year) were busting their share of the clay birds. With hunting seasons reduced every few years and limits more and more restricted, it can be difficult to teach a youngster shotgunning in a duck blind or a dove field. Shooting proficiency and skills are a product of practice. How better to involve the family than on a sporting clays field? Gun safety, gun handling and the comraderie that a familial outing affords are all there.

The choice of weapons is a simple one. Your 26- to 28-inch modified barrel is an excellent way to begin. Twenty gauge and a light one ounce load are ideal for the introduction of the kids and the ladies. Better to let them miss one or two extra targets than to get gun-shy when learning to properly mount the scatter gun. The shooting is more instinctive than skeet or trap, so it's a lot easier to end up with a bruised shoulder when using the heavier 12-gauge, $1^{1}/_{8}$-ounce shell. This is particularly true on the doubles and in the shooting of flurries where the rapidity of targets thrown allows little time to think about proper mounting of the shotgun.

There are presently nine Louisiana fields listed in the 1995 edition of Black's *Wing and Clay*, a new source of information on field shooting and clay target ranges. The centers are scattered around the state — Gueydan, Ragley, Belle Chase, Destrahan, Rayville, Haynesville, Ragley, Goodbee and Downsville are all listed as active sporting clays fields. The list continues to grow as more skeet and trap fields add sporting clays to their list of activities.

Though the cost per 50-target round varies slightly, a fair average seems to be $17 for non-members and $14 per round for members. Club memberships vary as well — ranging from $150 to $250 per year. Most memberships include family privileges for shooters and non-shooters. The grounds are all in well-maintained wooded areas with picnic and party facilities adjacent to the fields.

It's a wonderful way to spend an afternoon with the family. Kids are always happier in hands-on activities. With our growing problems of urban blight, it is a healthy new activity. If you've never handled a shotgun before or want expert advice on gun safety and lead angles for yourself or the kids, there are always experienced shooters willing and able to walk you through a round or two.

The paths to each station are smooth and well graded so that the wheel chair handicapped are able to handle the course with comfort. Safety glasses and hearing protection are mandated and available at the counter when you check in. The friendly atmosphere is another constant you'll come to expect. Sporting clays have been described as golf with a shotgun. Every course is different and your enthusiasm never wanes. ■

"Flurries" provide a challenging variety of shooting anglers and target sizes. The station is on a tower placed over a multiple launcher, which throws half-sized targets, regular skeet and a flat clay plate that performs acrobatic rolls and pitches.

Photo by Charles Frank

The Fisher Kings

BY CLIFTON COLES

Some hunt the shallows, silently stalking their prey along the water's edge with beaks ready to stab at anything resembling a fishy meal.

Some hunt from on high, using keen eyesight to scan the water, ready to plunge the moment a flash of fins appears.

Some hunt while floating along the surface, occasionally tipping forward to seize prey or diving deep to snatch crustaceans and small fish hiding near the bottom.

These are the piscivorous birds, the avian anglers, the fish-eaters, the fisher kings.

If there are fish to be found, there are fisher kings to take advantage of the opportunity.

Ospreys (*Pandion haliaetus*), for example, are Louisiana's fish eagles, superbly evolved to hunt the waters. They can be seen over Louisiana's lakes and coastal waterways, circling and intently watching for fish activity. The slightest ripple is inspiration enough for an Osprey to fold its wings and plunge into the water.

Ospreys' talons have evolved special tools for grasping their slippery quarry. On the inside of their feet grow masses of spiny extrusions called spicules that are unique to this fisher king.

The best time in Louisiana to see these magnificent fishers is during the fall and early winter, when large numbers of Ospreys move through the state on their southward migration. Most Ospreys are found near the coast but larger lakes and reservoirs inshore also provide productive habitat.

The beauty and skill of these hunters make Ospreys one of the most exciting bird species to watch. Birders can observe daring dives from as high as 100 feet. Ospreys exhibit supreme finesse as they gently swoop to within inches of the surface of a lake and almost magically pluck a fish from the water.

However conspicuous these beautiful predators are, most Louisianians are more familiar with ducks. Ringnecks, Scaup, Goldeneyes and Mergansers are what ornithologists call "diving ducks," which prefer deeper waters. They dive and swim beneath the surface to procure a staple diet of fish and crustaceans. Large webbed feet help propel them underwater.

A typical diving duck is the Hooded Merganser (*Lophodytes cucullatus*), the smallest merganser (16-18 inches in length, weighing 19-24 ounces) and one of the smallest ducks in North America. If its diminutive size doesn't help in identification, then the conspicuous white crest with its black border will certainly give this species away, particularly during the breeding season when it is used in complicated courtship displays. This characteristic gives it both its common name and its scientific name, which translates as "hooded diver." The female, like most ducks, is drab, but she too has a crest.

To help keep a fast grip on slippery prey, Mergansers have slender, pointed bills that are serrated, giving the appearance of teeth.

"Hooded Mergansers, Mottled Ducks and Wood Ducks are Louisiana's three consistent nesting waterfowl," said Department of Wildlife and Fisheries biologist Robert Helm. "Other species periodically nest here, but these three can invariably be found during the nesting and brooding seasons."

Like the Wood Duck, with which it is frequently confused, the Hooded Merganser is a cavity nester, preferring tree hollows in which to lay its eggs. Females have even been known to take over boxes intended for Wood Ducks. In Louisiana, 25-40 Wood Duck boxes (out of 2,200 total) provide housing for Hooded Mergansers annually.

Sometimes they congregate in small flocks along wooded swamps and brackish marshes. "They are one of the few birds you'll find in such saline habitat," said Helm.

Which is one of the places in winter months you may find the Belted Kingfisher (*Ceryle alcyon*). Few words can better those of Hannah Yates' in a 1959 *Louisiana Conservationist* article on this avian oddity: "The Eastern Belted Kingfisher has been well named as the 'Izaak Walton of Birddom' for he knows every pool where the minnows play [and] every projection along the bank where a fish might hide."

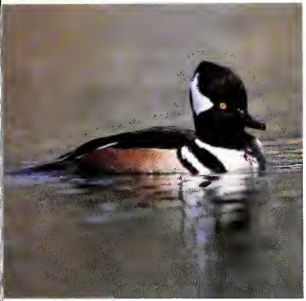
This reference to the 17th century English fisherman is an apt one. Not only is the Kingfisher skilled at the job of fishing, but this bird has made it an art form. It knows its territory well and will go from one successful hunting spot to the next. It will wait, sometimes for long periods, on a telephone wire or branch, with a well-trained eye scanning the water below for any movement. Like the Osprey, it waits until the right moment and rarely comes up empty-handed. Talons, however, are not the weapons wielded by this hunter. Unlike the Osprey, Kingfishers seize prey in their dagger-like beaks.

A strange, rattle-like call is enough to tell you if one of these birds is around. When spotted, its blue-gray general coloration with a white collar are important identification features.

The Kingfisher is one of the few birds skilled at hovering, an adaptation handy not only for searching for prey but for building a nest. Kingfishers dig burrows which can sometimes reach 15 feet in length, terminating in a nesting area. Talk about an excavation feat, particularly for a bird not much bigger than a robin.

At sea, you would expect to find fishing

Photo by Maslowski Wildlife Productions



Photos by Maslowski Wildlife Productions

Among Louisiana's Fisher Kings are the Belted Kingfisher, top, the Hooded Merganser, middle, and the White Pelican, bottom.

birds in abundance. You wouldn't be disappointed. From gannets to gulls and from pelicans to petrels, there are plenty of avian anglers to take advantage of the huge numbers of fish.

Most familiar are the pelicans. They grace the state seal, the state flag and almost everything to do with coastal Louisiana. The official state bird is the Brown Pelican (*Pelicanus occidentalis*), which is one of LDWF's success stories after being brought back from near the verge of extinction in the early 1960s. Hard work by LDWF biologists paid off to such a degree that federal officials were approached this year to delist the Brown Pelican as an endangered species in Louisiana. Current populations are estimated at more than 10,000 birds. This pelican's coloration is unique among these pouch-beaked birds. Most pelicans are white, including the more numerous American White Pelican (*P. erythrorhynchos*). All have similar adaptations for securing a meal. The large, expandable pouch from the tip of the beak to the throat allows pelicans to scoop up gallons of water. Brown Pelicans plunge after food while White Pelicans fish from the surface. Either way, water taken in the pouch is expelled and any fish caught in the scoop are swallowed.

The Northern Gannet (*Morus bassanus*) is fairly common 5-10 miles offshore during winter months. It is a truly pelagic species, only coming ashore to nest in secluded colonies along the Atlantic coast. Gannets plummet head-first into ocean waters from incredible heights, sometimes from as much as 150 feet. To help increase speed, they will flap their wings a few times while in mid-dive. The wings are held tight alongside the body as the bird torpedoes into the water. Air sacs under the skin of the breast help cushion the impact and sometimes the force of the dive is so great that the Gannet will be propelled 30 feet under the surface. No wonder offshore workers call them "Hell Divers."

Closer to home, with less-deep water to prowl, are long-legged waders: herons, egrets, bitterns, ibises, spoonbills. They go about their fishing single-mindedly, eyes intent on the water's surface, as if nothing could shake their resolution to snag a meal.

Anhingas and Cormorants don't have the long legs of these species, but they are just as determined. They hunt the waters duck-fashion, floating, then diving after prey. Anhingas (*Anhinga anhinga*) uniquely swim with their bodies under the water so that only the long, snake-like neck is visible. This gives this bird its common name of snake bird.

Louisiana hosts two Cormorant species, the Neotropical (*Phalacrocorax olivaceus*) and the Double-crested Cormorant (*P. auritus*). The former species lives year-round in the southwest corner of the state, while the latter, though only a winter resident and a rare breeder, is far more common. It ranges across the southern half of the state throughout available suitable habitat.

The feathers of Anhingas and Cormorants are not completely waterproof. This has disadvantages and advantages. Buoyancy is lessened, which helps the birds pursue fish underwater. But periodically they have to leave the water to dry out. Choosing a sunlit branch on which to spread wings and tail feathers makes them vulnerable to photographers and sightseers boating in the bayous.

Nature has designed the many adaptations for our feathered friends to fill important niches in the pursuit of fishes. Whether it's feet with special grips, beaks with "teeth," waterproof feathers, long legs, keen eyesight or just plain luck, the fisher kings triumph. ■

WILDLIFE INTERPOL

STORY & PHOTOGRAPHY BY CAPT. KEITH LACAZE

What? An international policing organization for wildlife? But that can't be! Law enforcement on an international scale deals with drugs, piracy, terrorism and all those other "real" crimes. Is poaching now viewed as such a serious crime that steps have been taken to coordinate wildlife enforcement at an international level? To the detriment of poachers and the benefit of conservation officers in the United States and Canada, the answer is yes.

Most people in Louisiana are aware of Operation Game Thief Inc. (OGT), the state program that pays cash rewards to anyone providing information leading to the arrest of poachers. But few people outside of OGT and the Department of Wildlife and Fisheries have heard of North American Wildlife Safeguard (NAWS).

In 1993, this non-profit organization was formed to operate a nationwide toll-free anonymous hotline. Concerned citizens can directly contact any OGT program on the continent, augmenting state and provincial programs in all 50 states and most Canadian provinces. On April 19, 1993, the hotline began operation. NAWS' toll free number is 1-800-800-WARDEN. This number is accessible to anyone in the United States and is cost-free to the caller and the state agency's program. Some Canadian provinces also are receiving information from the hotline.

Is effort on an international level really necessary? Many people, including wildlife enforcement professionals, believe so. As a result of increased education, better enforcement and a difference in the fundamental needs fulfilled by hunting, most wildlife officers feel that poaching has declined. But by no means has it ceased.

NAWS has become necessary due to changing times: the new mobility of hunters. Our hunter/gatherer ancestors travelled vast distances following the great herds they relied upon for sustenance. As societies became more settled, the nomadic hunter lifestyle was abandoned. Hunting became primarily a sport pursued locally. But once again hunters are on the long trail. Recent surveys show that more and more hunters are travelling to other states and other countries. Whether to hunt a species not found at home or to find bigger or more favored quarry, hunters are once again following the great herds.

Unfortunately, poachers have become increasingly mobile as well and mobility places the outlaw at a distinct advantage. Imagine the difficulties encountered by a wildlife officer trying to apprehend a violator who takes an animal illegally then drives or flies to another state. Imagine also the difficulties of conducting an investigation where suspects and witnesses are scattered across the country.

We must also consider some of the reasons why interstate mobility is part of current poaching. The "need to get my money's worth" excuse is frequently heard from captured outlaws who felt that travelling far and spending so much money justified an illegal kill so they could "bring home some meat." "We'll be long gone before anybody finds out" and "They've got so much game here they won't miss one or two" are also common rationalizations for the travelling outlaw.

Wildlife enforcement agencies rely heavily upon concerned sportsmen for tips about poaching. Such information leads to numerous arrests and confiscation of ill-gotten goods, such as the set of antlers, below, and illegally harvested deer, page 23.

Poaching for monetary gain is probably the most prevalent cause for illegal harvest today. Trophy heads obtained for resale and animal parts sold for real or imagined medicinal purposes are just some examples of resource robbery for high profit. How much is the illegal trade worth? While it is impossible to place a solid dollar figure on any black market, most enforcement officials agree that it is a multi-million dollar problem. Most of it involves travel and shipment across state lines and national borders.

NAWS now links the entire nation, assisting all wildlife enforcement agencies in the fight against poachers. Here's how it works. If the call is to report a fish or wildlife violation, NAWS operators will link the caller to the appropriate state's OGT program within 15 seconds. Operators for the state program take the information and relay it to an enforcement agent. NAWS operators are on duty 12 hours a day, seven days a week from 5 a.m. to 5 p.m. Central Standard Time.

Does the system work? Since April 1993, NAWS has transferred more than 3,000 calls to state programs with significant cases resulting. Here are just a few examples.

In early June, the Kentucky Department of Fish and Wildlife's OGT program received a call transferred from NAWS reporting mussel poaching on a Kentucky lake. Kentucky game wardens apprehended four scuba divers in the water. Each diver paid a $500 fine plus court costs, spent 30 days in jail and lost all equipment, including an 18-foot boat, a 25-horsepower motor and all scuba equipment.

A concerned citizen phoned NAWS and was transferred to Arizona's OGT program. The caller reported an Arizona resident had fraudulently purchased resident Alaska hunting licenses and bear tags for himself and his son and that a brown bear had been illegally taken. Arizona wardens, working with Alaska wardens, were able to make the case. The result was a guilty plea by the father, who was fined $5,000 in Alaska. Arizona agents seized two brown bear skulls and a brown bear shoulder mount from the suspect's residence.

Another concerned citizen telephoned NAWS about a poacher who had killed two large bull elk in closed season. After an investigation, Montana wardens apprehended the poacher. The court assessed a $5,000 fine and the poacher lost his hunting privileges for five years.

NAWS has proven to be a reliable nationwide violation reporting system with the capability to assist all state programs. With this ability to reinforce state OGTs, NAWS is a vital and effective part of current wildlife crime fighting.

Like the state programs, NAWS receives no government funding of any kind. It must derive income through donations and membership drives. Like Louisiana's OGT, NAWS intends to establish trust funds with principal amounts large enough to support operations with interest payments, leaving the principal untouched. In order to accomplish such a goal, NAWS needs the support of both sportsmen and wildlife officers.

In order to accomplish the establishment of adequate trust funds, NAWS Board Chairman Len Dickson of Colorado Springs, Colo., has initiated a nationwide membership drive. The drive is designed to benefit NAWS, state OGT programs and the group or business selling the memberships. "This drive is different since only $3.50 of a $10 membership goes to NAWS," Dickson said. "The other $6.50 is divided between the selling agent and trust funds set up for state programs. That should be all the incentive needed to get people involved in the drive."

Dr. George Dugal, Louisiana OGT president, agrees that everyone involved can benefit. "The nice thing about this membership drive is that those who purchase the memberships are helping both on a national and local level. That makes it a lot easier to sell to people who want their money to help here at home in Louisiana," he said.

NAWS membership is a good deal for the buyer too. For a $10 Annual Supporting Membership, the member will receive a membership card, a decal and five tickets for the NAWS Membership Drawing. The drawing will be held in January 1996 for 1st, 2nd and 3rd prizes valued at $82,500, $27,250 and $11,150 respectively.

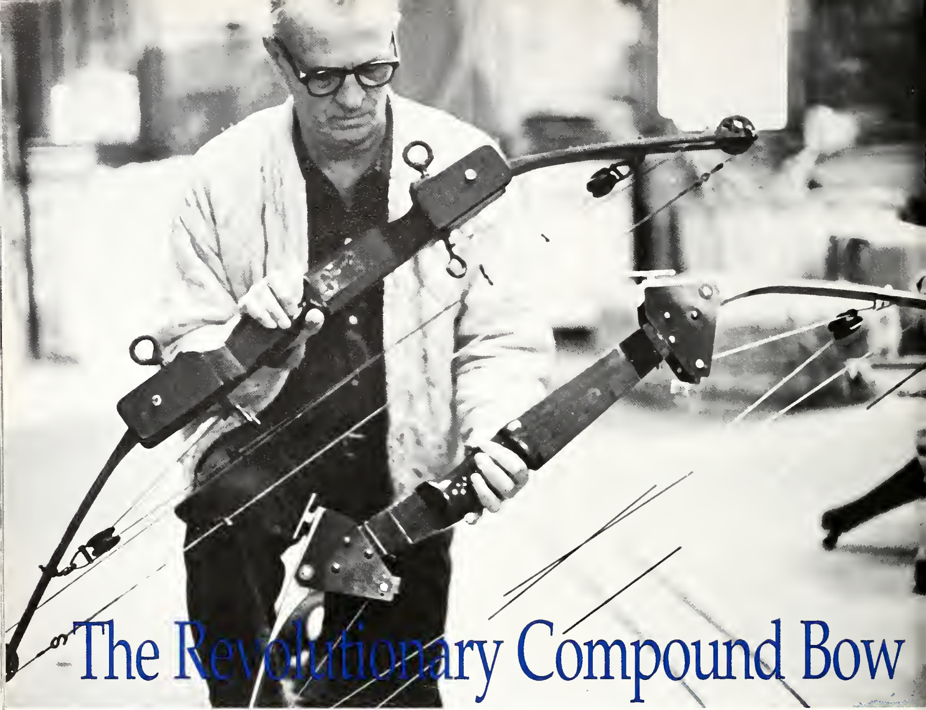
The program and the means to fund it are in place. All that is needed is for sportsmen to act now in support of NAWS. We as hunters today are under constant scrutiny by a society which by and large does not hunt, does not understand hunting, but does not object to hunting until their senses are assaulted by some atrocity committed by a poacher. True sportsmen must strive to make sure that everyone clearly understands the difference between hunter and poacher. Supporting NAWS and our own state OGT program are good ways to demonstrate the difference.

So now we really do have a Wildlife Interpol of sorts. How far can this international system go? It has great potential for further development. If 15-second international telephone communication is possible, then why not international wildlife violation records and license information?

Wildlife law enforcement is moving rapidly into the 21st century. Better training, education, equipment and communication are the vehicles carrying us forward. It's nice to know that North American Wildlife Safeguard is helping to lead the way. ■

Wildlife agents cannot be everywhere, all the time. Toll-free hotlines allow callers to anonymously report such crimes as illegal harvests of redfish, allowing wildlife agents to apprehend poachers even after they have left the area in which the illegal activity occurred.

Editor's Note: Case summaries cited as examples of NAWS at work were taken from Maine Fish and Wildlife *magazine, fall 1994 issue. For more information on North American Wildlife Safeguard, or on membership, write North American Wildlife Safeguard, 2860 S. Circle Drive, Suite 2136, Colorado Springs, Colo., 80906 or call 719/576-1564.*



The Revolutionary Compound Bow

STORY & PHOTOGRAPHY BY JOEL M. VANCE

When you count up history's revolutionary inventions, there aren't that many — the wheel, breakfast cereal, jet engines, television, the compound bow.

Whoa! The compound bow?

Put it this way — if the jet engine moved aeronautics from the Wright brothers to outer space, the compound bow took archery from the age of Robin Hood to the future faster than, well, a speeding arrow.

And all because of a buck that jumped the string, a high school physics textbook and a tenacious Missourian.

The late H.W. (Wilbur) Allen of Billings, Mo., invented the compound bow which today almost totally dominates the archery world. It was the most dramatic innovation in archery in 1,000 years but could just as easily be called the most innovative archery invention in history.

The first bows were simply a stick held in a bent position by a string. Native American bows were no more than this. Medieval archers, including Robin Hood and his Merry Men, used longbows, a longer version of the common bow.

Then came the recurve bow, shaped somewhat like a turned-up mustache. The recurve applied energy to the arrow better than the longbow.

Allen was a bowhunter. His first bow kill was in 1960. He was frustrated because deer literally could "jump the string." It had happened to him on a deer hunt near Chillicothe. A nice buck leaped at the sound of the bowstring and Allen's arrow passed through the space where the deer had been. Allen decided to look for a way to shoot a faster arrow.

Allen was a highly intelligent man who had tinkered all his life. His wife, Elizabeth, recalls that a nephew once asked Wilbur to make a little boat he could sail on the pond. Allen not only made a boat, but took springs and pieces from an old alarm clock and made a motor for the boat.

Allen did not accept the meaning of "can't." He knew there had to be a way to fire a faster arrow and figured the answer lay in the laws of physics. He was a skilled draftsman but knew little more physics than the average person. He borrowed a high school physics textbook from a neighbor and found a formula: $K.E.=\frac{1}{2}mv^2$. The energy of a moving object equals half the mass of the object, multiplied by the square of its velocity.

Allen knew that if he reduced arrow weight, it would increase arrow speed but conventional bows warped light arrows. Allen also knew that other parts of the bow, especially the limbs, were robbing the arrow of stored energy. One solution was to limit the movement of the limbs; another was simply to store more energy.

He devised a pulley system to limit limb travel (his bow limbs ultimately would move only about a third as far as a conventional bow) and then had the revelation that made it all work.

One evening in January 1966, he realized that if the pulley wheels were drilled off-center, they would release their energy much like a sling — smoothly and with increasing velocity.

The difference between a compound and any other bow type can be equated to a couple of sprint cars on a race track. The conventional bow applies full power when you release the arrow (step on the gas). It begins to lose force instantly. A car would sit and spin its tires. But the compound gradually applies energy to the arrow, building to peak push at mid-release. That car will win the race.

Allen began building his first compound bow the next day and was finished a day later.

An arrow from a compound leaves the bow at least 50 percent faster than an arrow from a recurve or longbow. It has a flatter trajectory because of speed, an aid to accuracy. Allen found that a 50-pound-pull conventional bow shot an arrow at about 140 feet per second, while a 50-pound compound, shooting the same arrow, would propel it at 200 to 230 feet per second.

For bowhunters, the compound has a unique and important capability. It can "relax" at full draw. Not to get into involved physics, but the use of the eccentric (offset-drilled) cams (pulleys) allows the bow to be held at full draw at a fraction of its pull weight.

Say a bow is rated at 50 pounds pull. It takes 50 pounds of effort to get the bow past mid-pull, which is the toughest part. Then the bow relaxes by as much as 70 percent, so the bowhunter is holding only 15 pounds. The 50 pounds is stored and will come into effect when the arrow is released but the bowhunter doesn't have to hold full draw weight, his arms quivering, while he waits for a deer to step into the open.

If you test a compound bow of, say, 50 pounds pull against a recurve of the same pull weight, you'll find that not only will the compound shoot faster and flatter, it also will bury an arrow about twice as deep in a target. There simply is more energy applied directly to the arrow in a more efficient way.

Allen was no stranger to the making of bows. "Archery has been a hobby since my second year in high school," Allen said in the 1970s. "I still have some old bows I made back in the '30s. There's one of Osage orange and one of walnut backed with hickory." He experimented with designs to get more arrow speed, but none were satisfactory (one broke the bow).

Allen had worked in an aircraft wing plant in Kansas City in the 1950s. When the wing section was closed, he began making wire baskets for florists. In 1967, not long after he'd invented the compound and just about the time the first publicity came out, he and his family moved to Billings "to be closer to the good fishing and hunting."

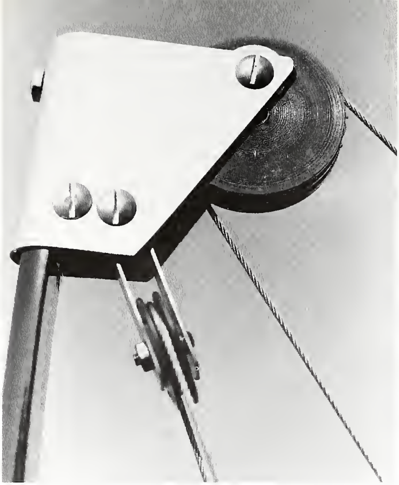
Allen had not intended to get into bow production himself. He had hoped a major manufacturer would agree to produce the bow under license but the big companies were almost hostile to the revolutionary contraption (mostly because they didn't think of it first).

So Allen opened shop in Billings. He designed and built more than 100 jigs and patterns for the bow. In 1970, Allen produced 350 bows at his makeshift shop. He could have sold a couple thousand. It took three months to get an Allen bow then because the shop ran so far behind.

Like any innovator, Allen faced a host of problems that had nothing to do with actual production. Allen's bow wasn't even legal for hunting in Missouri. The Conservation Commission considered it a mechanical aid to archery, which is illegal.

But Allen had a friend in former Wildlife Division chief Dean Murphy who was convinced the bow didn't add anything, that it merely used what the archer put into it in a more efficient way.

In addition, the big bow manufacturers fought him tooth and nail. It was analogous



Allen's invention included the addition of a pulley system, above left, and construction of the riser and limbs that allowed energy to be transferred to arrows more efficiently. The result was faster arrow speed and greater force of impact.

to how the oil companies would react if someone came along with an engine that runs on water. They couldn't produce the compound because he had it patented and they realized the threat to conventional bows. Some target archery associations initially banned the compound from competitive shooting but gradually came around as the bow became widely popular. It simply was too good a thing to be ignored.

Some archers scorned the newfangled bow because they said it was ugly and nontraditional. Archers had earlier scorned aluminum arrows and bow sights, too. And they forgot that the recurve bow wasn't traditional at all when it was developed.

In May 1967, Tom Jennings wrote a laudatory *Archery World* magazine article on the compound bow which helped pave the way for the bow's acceptance by archers, especially bowhunters.

The invention came at the ideal time. The 1970s were a growth period for archery equipment. In 1974, archery equipment was the hottest item in sporting goods, outstripping tennis, golf, bicycles and bowling equipment. In 1975, a writer predicted that the compound would amount to less than a third of the bow market, one of history's finest missed predictions.

Some manufacturers decided to ignore the patent, which was a mistake. Allen was a gentle man as well as a gentleman, but he also intended to protect his invention. There were nine lawsuits over patent infringement, involving seven companies. Allen won them all, though some weren't settled until after his death.

The patent ran out in 1986. According to patent law, "significant improvement" must be done to a patented invention to renew the patent and Allen had died before the patent ran out.

So, there is no more Allen Archery but every archer who uses a compound owes it all to Wilbur Allen. The original compound bow is in the Smithsonian Museum.

Allen had indicated an interest in making a donation to the Missouri Conservation Department before he died in 1979. His widow, Elizabeth, followed through with a $100,000 donation that helped buy the 380-acre Wilbur Allen Memorial Wildlife Area. In keeping with his interest, deer hunting on the area is limited to bows and crossbows.

The family also has helped buy a wildlife area in North Dakota, where one of the three Allen sons, Stephen, is a wildlife biologist.

Compound bows have advanced considerably over that first bow. The "relax" feature is much improved, materials are high-tech and designs vary somewhat from the original.

But no matter how many whistles and bells today's compound has, it is the direct descendant of an innovative arrangement of pulleys and cables invented one winter night by a Missourian with vision. ■

NEWTS to YOU!

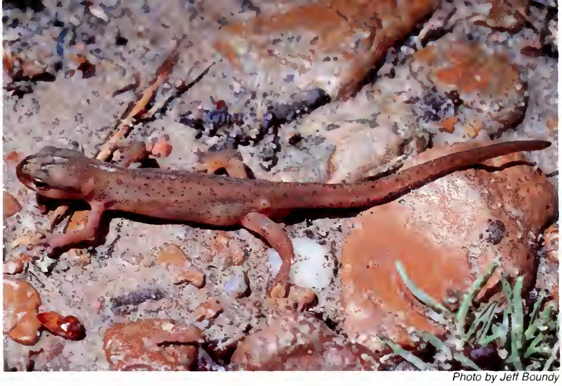


Photo by Jeff Boundy

BY STEVE SHIVELY & JOHNNIE TARVER

When is a newt not a newt? When it's an "eft" or when it's Newt Gingrich, Speaker of the U.S. House of Representatives.

What is a newt, and what is an eft? In Louisiana, a newt is *Notophthalmus viridescens louisianensis*, the central newt, a 2- to 4-inch-long, greenish-colored salamander. An eft is one of several larval forms of a newt.

Salamanders, being amphibians, go through a somewhat complicated life cycle which usually involves an unshelled egg laid in water and hatching into an aquatic larva with gills which ultimately transforms into a terrestrial adult. Usually. There are several variations on this basic pattern, depending on the species. Eggs may be laid in merely moist locations (such as beneath or inside of decaying logs) rather than actually in the water. Larvae may develop within the egg and hatch as miniature adults. Aquatic larvae may become sexually mature, retain their gills and remain in the water throughout their lives. Or, aquatic larvae may lose their gills and develop lungs, but persist in the aquatic lifestyle as adults.

And then there is the case of the newt. Mama newt (*not* Mrs. Gingrich) lays as many as several hundred eggs over a period of several days during the Winter. She attaches each egg singly to vegetation below the surface. An egg hatches into an aquatic larva as much as three weeks after being laid and this larva usually transforms several months later into yet another, terrestrial larval form, the eft. The eft eventually returns to the water and transforms yet again into an adult newt. This "double reverse" type of life cycle may be advantageous in a habitat characterized by fluctuating water levels (eggs aren't "all in one basket" — also advantageous in Congress) or it may aid in dispersal (via the terrestrial stage) from one body of water to the next.

Efts resemble adult newts, except that efts have rough, dry skin and skinny, more lizard-like tails as opposed to the newt's smooth, moist skin and more fish-like tails which are vertically expanded into fins. Efts are sometimes called "red efts" because they are bright orange in some parts of their geographic range. Louisiana efts, however, are usually dark green or dull olive.

Central newts inhabit sluggish water bodies, usually with submerged vegetation, where they feed on aquatic insects, small crustaceans and snails. Efts are usually found under debris on the ground near newt habitat. Newts are small and soft and thus seemingly vulnerable to predation by fish, frogs, snakes, and turtles sharing their watery domain, but their color and pattern help them blend in with the aquatic vegetation. In addition, somewhat toxic skin secretions are believed to protect newts from these predatory enemies. Efts may be as much as ten times more toxic than newts and, when threatened, may posture so as to expose much of their bright yellow bellies. This is apparently a warning to would-be predators. One Louisiana scientist reported that some newts he caught rolled over and closed their eyes when disturbed, possibly either in an attempt to "play 'possum" or, again, to display their bright yellow bellies as a warning. It is as yet unclear whether such defensive strategies might work as well in the U.S. Congress as in a Louisiana swamp. As the two habitats are so remarkably similar, poisonous skin and exposing the belly may someday become as common a ploy as the filibuster on Capitol Hill.

Turning over logs or boards near a body of water harboring newts will sometimes reveal an eft or two. Turning over logs or boards near the Potomac River in Washington, D.C., may reveal other, even more unusual creatures.

Maybe, the Washington "Newt" will help amphibious newts, as well as 1,800 other non-game species, by supporting the call by the International Association of Fish and Wildlife Agencies for a wildlife diversity initiative (*Louisiana Conservationist*, January/February). That initiative proposes to build upon existing programs that work so successfully to conserve animals that are hunted and fished. It could generate more than $350 million each year to protect and conserve these other species of fish and wildlife, create many more recreational opportunities for people to enjoy wildlife and educate the public about the importance of wildlife diversity. ■

LAW LINES

Behind the Badge

BY CAPT. KEITH LACAZE

Look Before You Launch!

Take a look at your safety equipment and yourself before launching the boat.

As we swing into the warm weather of summer, boating once again becomes the favorite outdoor activity. That is only natural in a state blessed with a fascinating coastline, miles of inshore waters and more lakes than we can count.

Proper planning and preparation before the first launch of the season are an absolute must for every boater. Safety equipment should be the number one concern. If you don't have it, get it. If you do have it, make sure it's in top condition.

The most important safety item on any vessel is the Personal Flotation Device (PFD) or life jacket as it is commonly and most appropriately called. Every recreational boat must carry at least one U.S. Coast Guard approved PFD for each person on board. All PFDs must be in good condition, readily accessible and of the correct size for the intended wearer. Purchase PFDs of the correct size for children. This is one thing that must not be bought with "growing room" in mind.

An important reminder concerning PFDs is that effective May 1, 1995 the Type IV or throwable PFD is no longer acceptable as the primary PFD for any person on board any recreational boat. All boats up to 26 feet must have a Type I, II or III PFD aboard for each person on board or being towed on water skis and, in addition, at least one throwable Type IV. Patrolling wildlife agents are now educating boaters and issuing warnings about the new regulation before actual enforcement begins.

Another important safety item is Visual Distress Equipment. All recreational boats, when used on coastal waters and the territorial seas in areas greater than two miles wide, must be equipped with visual distress signals. Recreational boats less than 26 feet in length, boats participating in organized events, open sailboats less than 26 feet in length not equipped with propulsion machinery and manually propelled boats are not required to carry day signals but must carry night signals when operating after dark.

The two types of visual distress signals are pyrotechnic and non-pyrotechnic. Pyrotechnics must be Coast Guard approved and include light- or smoke-producing flares. Non-pyrotechnic signals include orange distress flags and electric distress signals. They must meet Coast Guard requirements.

Fire extinguishers are required on all mechanically propelled vessels less than 26 feet with the exception of outboard motorboats with construction features which will not permit the entrapment of explosive or flammable gases and fuel tanks which are not permanently installed. A B-1 U.S. Coast Guard approved extinguisher is the type required and, whether the law demands so or not, keeping one on board is a good idea.

Navigation or "running lights" must be displayed between sunset and sunrise by all recreational boats. They must also be displayed during daylight periods of reduced visibility. Remember the green light is on the starboard (right) side and the red light is on the port (left) side of the bow. The stern light must be white and visible from all directions.

Boats of less than 26 feet must also carry a hand, mouth or power operated horn, whistle or bell. It is a small but important item and is a good idea for any boater since it can be used to signal for help or to make your presence known to larger vessels.

Other safety equipment not required by law but dictated by common sense are paddles, an anchor, a basic tool kit, a first aid kit and plenty of spare rope or line.

Consider that mental preparation is just as important as good equipment. Expecting the unexpected can prevent a serious accident. Consider also these five special accident facts provided by Lt. Col. Charlie Clark, Assistant Chief of the Enforcement Division and Louisiana State Boating Law Administrator:

1. Collision accidents account for 30 percent of all boating accidents and generally take place in curving waterways or at junctions. Always remain on your side of the waterway and approach junctions carefully. Slow down.

2. Falling from or swamping of small boats accounts for nearly half of all boating deaths annually. Never overload a boat, never travel in open water in small boats and always wear your PFD.

3. Hitting underwater objects presents a special problem to Louisiana boaters. Wear your PFD and attach the kill switch securely to your person. Navigate slowly and cautiously in unfamiliar waters.

4. Passengers in boats account for one-third of all boating fatalities. Although the boat operator is ultimately responsible for passenger safety, passengers should take basic steps to ensure their own safety. Wear a PFD, help keep a lookout for danger and learn the location of and how to use all safety equipment. If you are tired of reading "wear your PFD," I'm not sorry. It is the number one life saver on the water.

5. Boaters who have taken an approved safe boating course represent less than 1 percent of boating accident statistics. Smart boaters know that knowledge represents the ultimate defense against tragedy.

Take a Safe Boating Course, even if you are an "experienced" boater. It is time well spent. Call 504/765-2984 for more information on how to sign up for or arrange a course.

Education Corner

A CLOSER LOOK

Lyle M. Soniat, Ph.D.
Louisiana Sea Grant College Program
Jean May Brett
St. Mary's Dominican High School

I know my son will remember all the details of his first duck hunt just as I can recall the time my father and uncles finally let me join them. We were both so excited about that day's hunt that we checked the gear a half dozen times the day before. I don't think my son really slept.

We were in place and ready as a noisy flight of ducks came into view. He took aim on the sounds of a single duck in view from our blind. The quacking had broken the silence around us like a knife and as I closed my eyes to a squint, adjusting for dawn's pattern of light, the white borders in the wing patch indicated this was a Mallard hen. It apparently was a stray from the recent flock; decided — "Don't shoot!"

Identification

The scene above is familiar to countless hunters across the state. The experienced hunter is alert and knows what to look for before shooting. Characteristics for positive identification include size, shape, colors and patterns of plumage. Wing-stroke, voice, takeoff style and swimming posture also provide helpful clues.

Proper identification is a key to responsible management and maintenance of both game and non-game species. Management agencies indicate that with proper weather and habitat conditions, the Mallard (*Anas playryhynchos*) population can handle a 25 percent annual reduction.

Good eating is one of the rewards of proper identification. The rice-fed Mallard provides a more enjoyable meal than the Shoveler, or Spoon-billed Duck. Although these ducks have some physical similarities, the Mallard can be positively identified by its slow wing stroke and the "spoonie" by its telltale spoon-shaped beak.

Taxonomy

The classification and naming of living things is a foundation of biology and natural history. For hundreds of years there was no organized arrangement or identification system for organisms. Animals were given local or common names, often culturally based on appearance and behavior or on superstitions. As the world became tied together by exploration and colonization, attempts to complete an inventory resulted in descriptions that were five or six lines long. Differences in the common names, changes in appearance over the year — such as the variance found between eclipse and breeding plumage in Mallard drakes — and the full scope of an organism's habitat necessitated a system.

The taxonomic hierarchy used worldwide is based upon the observations and collections of Carolus Linnaeus, an 18th century naturalist. With his two-word system of binomial nomenclature, each organism is assigned two Latin or Greek names — its genus and its species — the universally accepted scientific name for the organism. The use of scientific names ties together all those interested in a species — the scientist and the sportsman.

Although the names selected must follow some official guidelines, they may indicate who discovered the organism, its geographic location or perhaps be descriptive in nature. For example, some species identified in Louisiana are *Rubus louisianus*, a blackberry, and *Lactuca ludoviciana* from the lettuce family. Descriptive names are abundant. For example the water elm is officially *Planera aquatica*; and it seems appropriate that the western gray squirrel is *Sciurus griseus*.

Systematics

Over the past 200 years, important scientists such as Darwin and Lamarck have worked with taxonomic classification but little change occurred in method. A species was identified as an evolutionary product with one true history. Classification was based on morphology — the reliable, visible features such as the form and structure of the plant or animal.

Recent changes in this field have altered the direction and practices of taxonomists. Today the emphasis is on finding and identifying species rather than the act of naming them. Scientific advancements in the 20th century allow for a more in-depth and rigorous process of identification. Advancements in the 20th century provide scientists with the ability for more in-depth and rigorous identification on the basis of the interior biochemistry that determines the outward appearance, while the birder or hunter will continue to identify by size, voice, wing-beat and plumage. If evolution is continuous and ongoing, significant exterior manifestations may not be used to identify separate species in the future.

For proper identification, evolutionary relationships must be studied and understood, too. A classic example of this philosophical change is the awareness that birds are descendants of dinosaurs and that more than one species branched from these huge ancient animals. Some might say several species branched from the dinosaur like limbs from a tree trunk. Changes like these have led taxonomists to rewrite some previous classifications.

The resulting classifications may be absolutely new or an expansion or reduction in previous taxonomy. The dozen species of Louisiana irises classified by John K. Small in the early 20th century may, because of evolutionary relationships, be regrouped into only four species. A species of Appalachian salamander may be reclassified into as many as 16 different species because, over many years, the geographic isolation of different salamander populations has resulted in a variety of genetic patterns.

Today the taxonomist is a hunter armed with the genetic knowledge collected in the lab, and scientists are actively seeking specimens not yet collected but predicted. These predictions develop when spaces are found during studies on closely related species. The genetic code will provide scientific hunters with a means of determining whether specimens represent a new species or a variant of an already named and studied group. The diversity of life forms promises years of continued discovery and a multitude of opportunities to arrange and classify.

Activity

To classify plants and animals, scientists use guides or Taxonomic Keys. A dichotomous key is a series of paired statements developed to assist in identification by using a process of elimination. The first pair of statements usually addresses general characteristics, followed by more specific statements. Species identification is completed as characteristics are matched. Try the following simple example of a dichotomous key on these popular fish.

1. a. Bold lateral stripes — go to # 2.
   b. No lateral stripes — go to # 4.
2. a. Deep body shape — go to # 3.
   b. Streamlined body shape — striped bass (*Morone saxatilis*)
3. a. Yellow color — yellow bass (*Morone mississippiensis*)
   b. Silvery color — white bass (*Morone chrysops)*
4. a. black operculum (gill cover) — Bluegill (*Lepomis macrochirus*)
   b. operculum not visible — go on to # 5.
5. a. 5, 6 dorsal fin spines — white crappie (*Pomoxis annularis*)
   b. 7, 8 dorsal fins spines — black crappie (*Pomoxis niqromaculatus*)

CONSERVATION notes

1995-96 Wild Louisiana Stamp Chosen

The work of Baton Rouge artist Claude A. Houchin was chosen for the 1995-96 Wild Louisiana Stamp. Houchin's painting features the purple blooms of the Louisiana iris. The stamp will go on sale for $5.50 May 1, 1995, at parish sheriff's offices, Department of Wildlife and Fisheries headquarters in Baton Rouge (2000 Quail Dr.), LDWF's New Orleans office (1600 Canal St.) and sporting goods stores statewide.

Houchin's painting depicts a freshwater wetland with irises in the foreground and dotting the river bank.

Monies generated by stamp sales are dedicated to LDWF watchable wildlife, endangered species and land stewardship programs coordinated by LDWF's Natural Heritage Program.

Refuge Field Biologist Michael Carloss Recognized

Wildlife and Fisheries biologist Michael Carloss has been recognized for his activities to enhance the state's coastal marshes. Carloss received the Louisiana Wildlife Biologists Association's Outstanding Field Biologist Award Feb. 18, 1995, in Natchitoches. Carloss, who is supervisor of Atchafalaya Delta Wildlife Management Area in St. Mary Parish, was honored for his inspired concept and implementation of a shell island rookery at Marsh Island Refuge.

Carloss' plan involved moving more than 14,000 cubic yards of shell to Marsh Island to provide nesting habitat for native bird species. This project was completed in March 1994 and approximately 100 skimmer and tern nests were recorded by May.

Turkey Hunters Contribute to Wildlife Management

Louisiana turkey hunters have pledged $25,000 during the next five years for reforestation of public turkey hunting lands. The Louisiana Chapter of the National Wild Turkey Federation presented the first $5,000 check Feb. 20, 1995, to the Department of Wildlife and Fisheries.

The money will be used by the department to plant hardwoods and other mast-producing trees in bottomland-hardwood sites on wildlife management areas throughout the state.

Exxon Catalyst for Conservation Effort

Exxon Corporation has donated $150,000 to support restoration of wetland habitat in the Atchafalaya Basin. The Department of Wildlife and Fisheries and co-planner Ducks Unlimited, along with U.S. Army Corps of Engineers, saluted Exxon at a reception Wednesday, Feb. 15, 1995, in Baton Rouge.

The Sherburne Wetlands Restoration Project will return 2,400 acres in Iberville Parish to its rightful owners — the wildlife.

The project involves construction of a water delivery system to provide water to the protected acreage at desired levels during waterfowl wintering and migrating seasons.

Cooperative Science Memorandum of Agreement

Scientific cooperation between four state environmental agencies and the U.S. Department of the Interior National Biological Service (NBS) was formalized Jan. 31 in New Orleans by the signing of a "memorandum of agreement" to benefit resource management. The memorandum will strengthen cooperation on scientific research between state and federal science agencies.

The agreement also restated the commitment of NBS to cooperate with Louisiana in providing solid science to support restoration projects and development of a statewide oil and gas database.

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Bayou Kitchen

Photo courtesy of the La. Seafood Promotion and Marketing Board

Oysters Rockefeller

- **1 pound butter**
- **1 stalk finely chopped celery**
- **4 bunches green onion, finely chopped**
- **2 bunches parsley, finely chopped**
- **1½ ounces Worcestershire sauce**
- **1 teaspoon Tabasco**
- **6 ounces Herbsaint**
- **3 cups cooked spinach**
- **10 ounces bread crumbs**
- **48 fresh Louisiana oysters on the half shell**

In a large skillet, melt butter. Add celery, green onions and parsley. Saute 5 minutes. Add Worcestershire, Tabasco and Herbsaint and cook over medium heat for 10 minutes. Add spinach and bread crumbs and cook for an additional 5 minutes. On top of each oyster on the half shell, place a tablespoon of sauce on each oyster. Bake at 375 degrees for 3 to 5 minutes. Serve hot. Six oysters per serving as an appetizer. Serves 8.

Oyster Stew

- **3 dozen small to medium La. oysters, in their liquor (about 18 ounces)**
- **¼ pound (1 stick) unsalted butter**
- **1 cup finely chopped celery**
- **¾ teaspoon Chef Paul Prudhomme's Seafood Magic**
- **½ cup finely chopped green onions**
- **2 cups heavy cream**

Add the water to the oysters and refrigerate at least 1 hour. Strain and reserve oysters and oyster water. Keep refrigerated.

In a large skillet combine the butter, celery, Seafood Magic and 3/4 cup of oyster water. Cook over high heat for 3 minutes, shaking pan (versus stirring) almost constantly. Add remaining 1/2 cup oyster water and continue cooking and shaking pan for 1 minute. Stir in green onions.

Gradually add cream, whisking constantly. Add oysters and cook just until the edges curl, about 2 to 4 minutes, whisking constantly. Remove from heat and serve immediately, stirring well as you ladle out the portions. For the main course, ladle 9 oysters, a little of the vegetables and 1 cup of the liquid into each serving bowl. For appetizer, serve 1/2 that amount. Serves 4 as a main course or 5 as an appetizer.

Butter Basted Oysters

- **½ stick butter**
- **½ stick margarine**
- **1 pint fresh Louisiana oysters**
- **¼ teaspoon red pepper**
- **¼ teaspoon salt**
- **¼ teaspoon black pepper**
- **2 tablespoons chopped green onions**
- **flour**

Melt butter and margarine in skillet. Drain oysters and season with red pepper. Dredge oysters in flour that has been seasoned with salt and black pepper. Drop coated oysters into hot skillet. Saute each side until golden brown. Sprinkle with chopped green onions. Serves 4.

Recipes courtesy of Chef Michael Roussel, Brennan's Restaurant; Chef Paul Prudhomme, K-Paul's Louisiana Kitchen; Chefs Duke & Mike Landry, Don's Seafood & Steak House.